学苑・英語コミュニケーション紀要　No. 870　38〜46（2013・4）

Attention and Technology in the Language Classroom

Kevin Ryan

Abstract

Technology in the language classroom has caused disruption of late. Attention is one area that many teachers feel the need to address. A closer look at attention reveals there are cultural and linguistic differences in the concept and how it relates to attendance. Psychology and personal interactions affect attention when we factor in use of technology such as social media and constant access to the Internet. A large body of linguistic research on attention reveals that technology both enhances and confounds classroom interaction. The final section deals with suggestions for technology use to enhance attention in the classroom, or at least get students to recognize and use their intentional attention wisely.

Attending to Attendance and Attention

Attendance in the classroom is commonly defined as being present, a cognate of the Japanese 出席. There is also a medical definition, one where a physician is in attendance at a hospital, providing a service, mostly based on an archaic definition of *waiting for the master*. A close look at Webster's dictionary will show a somewhat tautological definition of attendance to mean *the number of persons attending*, or *the number of times a person attends*. If we follow on, we find that attend means to *pay attention to*, another tautology. Note that further down the list of definitions, after *look after*, and *take charge of*, and the older to *wait for*, we finally arrive at the definition common to teacher, to *be present*. Curiously, there is no Wikipedia entry for Attendance in English.

If we continue looking, we find the intransitive verb to be much more interesting. They are primarily about the self or the mind, not the body. To attend to your work is to *apply yourself*, and to pay attention is to *apply your mind*.

The use of the word attention here leads us to the *OED*, where we find that after references by Chaucer and Shakespeare, a cogent definition arises in 1690 with John Locke, in *ESS. Humane Understanding*, "When the Ideas that offer themselves,..are taken notice of, and, as it were, registred in the Memory, it is Attention." Thus, according to Locke, Attention is very much akin to Learning; or at least has elements of Learning. We could go so far as to say that Attention is a requisite element of Learning.

This is all a rather long way to introduce a topic of central importance to language learning; attention. For one cannot learn anything without attention, but this effect is

compounded in that, as we will see later, language is essentially our attention applied. We will discuss attention and its role on many levels. The newest manifestation of a concern about attention is how technology affects it, and how that affects our already considered opinions on learning, languages and classroom management.

Attention

Howard Rheingold, author of *Net Smart: How to thrive online*, begins his classes at Stanford University by asking his students to shut their laptops and turn off their phones. This is unusual these days, but not surprising. Then he asks them to close their eyes. This does surprise them. He asks them to monitor their thoughts, and how they jump from one topic to another, and how effortless it is.

After asking them to open their eyes again he explains how there is no need to work at making your mind wander. It does that all by itself. Then he goes on to explain one of the five digital literacies his class is going to address: Attention. Rheingold: "'I can't change your mental habits in a single semester,' I continue, after they open their eyes, 'but I can suggest a simple, powerful idea: you can learn to be aware of how you shift your attention when your phone buzzes or your laptop screen beckons'" (2012, p. 35). These five new digital literacies all depend on attention, the most basic and integral to learning itself. The other four literacies are Crap Detection, Participation, Collaboration, and Net Smart. This author will be using *Net Smart* as a textbook for his Computer Literacy course this semester.

Attention is a coping mechanism, one that allows us to avoid psychosis. Some kinds of autism are essentially a lack of an attentional filter. This filter operates because it is necessary. "In fact, it is estimated that in any given second we consciously process only sixteen of the estimated eleven million bits of information our combined senses pass to our brains" (Karges, 1999).

Attention was first studied in the field of philosophy. In print, the first reference to the study of attention might be in relation to memory. Juan Luis Vives, a Spaniard born the year after Columbus discovered America, found that memory improved with attention. As psychology developed, Leibnitz coined the term "Apperception", which refers to "the process by which new experience is assimilated to and transformed by the residuum of past experience of an individual to form a new whole" (Runes, 1962). At this time, scientists were just starting to differentiate the voluntary and involuntary applications of attention. This is among the earliest examples of research into what we now call multitasking. Most termed the opposite of attention as distraction. In the early 20th century ideas from behaviorism brought studies of task switching and tests that confounded perception, requiring attention to be focused. The "Stroop Effect" was the most common of these, with tests made of words of colors, themselves colored in a different hue. The confusion caused a doubling of the processing time. In the latter part of the last century, listening to two streams of verbal

information and being tested for comprehension became a dominant experimental method (subjects were told to focus on one of the two streams). Debate centered around whether the unattended audio stream entered consciousness or not. This lasted until electrical signals in the brain offered better data. With the advent of PET scans and fMRI, the field blossomed, lead by Michael Posner. Terms like Selective Attention, Divided Attention, Bottom-up vs Bottom-down, Overt and Covert, Processing load, and others brought a much clearer delineation between voluntary and involuntary attention.

Most interesting is one branch of attention study that dealt with cultural differences; what we pay attention to, and the balance between multiple targets of simultaneous attention. Research shows that indigenous cultures were better able to balance attention among different targets, even among children, whereas cultures with technology showed a propensity to categorize and stratify multiple targets, unable to attend equally.

Many believe that requirements of our modern society have led to a higher appreciation of conscious, focused attention. Even the advent of the timepiece, for example, has quantified time to such a degree that it seems natural to divide time into seconds, minutes, and hours. The scientific method and atomization of knowledge into fields has required us to ignore more and more in an effort as individuals to understand more deeply small slices of reality.

Attention has always been linked to learning, and is even reflected in the structure of the brain.

> The discovery of "mirror neurons" in primates strongly implies that paying attention to others is one of the few human cognitive capabilities that may be neurally "hardwired." Mirror neurons fire when you do something, but they also fire in the same way when you watch someone else doing the same thing.... Unlike most species, we are able to learn by imitation, and this faculty is at the basis of human culture (Rheingold, 2012, p. 40).

The trainability of attention is a requisite for society. Only humans attend to the mental state of others in order to increase their knowledge and teach them.

One of the primary tools of the experimental psychologist is to study cases that are abnormal, that lack a certain factor in which the researchers are interested. So, too, with attention: looking at when, where and how attention is interrupted or prevented leads to a deeper understanding.

Multitasking, once touted as a way to get more done, is now being questioned by researchers. Clifford Nass of Stanford looks at multitasking as it is employed by consumers of media, new and old. There is a sliding scale of multitaskers; people who can answer an email, hold a conversation and update their facebook page would be called high multitaskers. Studies today focus on two areas. One is whether high multitaskers are better at focusing attention or not. The other deals with switching tasks. Nass and others have proven that there is no such thing as real multitasking, which is like running two or more processes in

parallel (like the newer computers). Humans may look like they are multitasking, but they are actually switching back and forth between tasks very quickly. This has many negative effects, many which slow us down. Some studies have found it takes longer to multitask than to perform the tasks in a series, one after another. It also leads to more errors.

Salon Magazine writer Katie McDonough reports a study done in Michigan that showed that even short interruptions can cause a rise in the number of mistakes a person makes. "Researchers asked 300 people to perform a sequence-based task, and found that interruptions lasting just *seconds* managed to double the error rate" (McDonough, 2013). We even see that multitasking among tween girls in the US is correlated with "a series of negative experiences: feeling less social success, not feeling normal, having more friends whom parents perceive as bad influences and sleeping less" (Stober, 2012).

Even while users are aware that multitasking is inefficient, the practice continues to proliferate. "As many as 80% of people multitask on a mobile device while watching TV, finds a new study." and "70% of respondents multitask at least once a week; 49% do so daily." and "60% browse the mobile web, of which 44% search for unrelated content and 38% search for related content" (Fox, 2011).

Attention and Technology

The ubiquitous presence of an Internet connection provided through a cell phone network has had a lasting effect on people, and among them the most affected are teens and youth, who participate more than those in other age-groups. But first we must tease out the newer technology from a far more prevalent technology—reading.

Pundits have taken to giving warnings about how technology is affecting our brain, and how interactions in society are changing as a result. Many of these are purportedly related to rises in use of technology. One of the best known of these pundits is Nicholas Carr.

Nicholas Carr, in his 2010 book *The Shallows*, excerpted in the *Atlantic* in 2008, argues that the Internet is designed in a way that encourages skimming and discourages deep reading. He quotes the cognitive researcher Maryanne Wolf, "When we read online, she says, we tend to become 'mere decoders of information.' Our ability to interpret text, to make the rich mental connections that form when we read deeply and without distraction, remains largely disengaged" (Carr, 2008).

About a decade ago, Linda Stone coined the term *continuous partial attention*. When you see someone constantly checking their phone for messages or facebook updates, when you see that they are not listening or participating in a meeting with all of their attention, this is continuous partial attention. Different from multitasking, which has as a goal more efficient operation, continuous partial attention strives for constant connection with a channel of communication. Stone: "We pay continuous partial attention in an effort NOT TO MISS ANYTHING. It is an always-on, anywhere, anytime, any place behavior that

involves an artificial sense of constant crisis" (Stone, 2002). Stone brings up another useful way to look at technology and how it affects us. Like sleep apnea, a disruption of the breathing rhythm during sleep, Stone noticed first in herself, then studied in others, email apnea. She found that when she checked her email, there was a hitch in her breath, a stopping of the intake of air.

Sherry Turkle has worked for decades at the intersection of emotion and computing. She is the current director of the MIT Initiative on Technology and Self. In her most recent book, *Alone Together: Why We Expect More from Technology and Less from Each Other*, she writes about how she has seen an evolution of social interactions, where we now pay more attention to our machines than we do to our friends. She states in the introduction,

> These days, insecure in our relationships and anxious about intimacy, we look to technology for ways to be in relationships and protect ourselves from them at the same time. This can happen when one is finding one's way through a blizzard of text messages; it can happen when interacting with a robot. I feel witness for a third time to a turning point in our expectations of technology and ourselves. We bend to the inanimate with the solicitude. We fear the risks and disappointments of relationships with our fellow humans. We expect more from technology and less from each other (Turkle, 2011, p. xii).

Rheingold (2012) sums up the situation: "The habit of multitasking, amplified by technologies of distraction, is hurting our capacity for sustained attention. Unwittingly, we increasingly base our personal relationships on surveillance as opposed to trust. Books are disappearing (or will be soon); we're sacrificing our "hard-won" ability to wrestle with a text."

Attention in the Classroom

With the pervasive use of laptops in the US and Europe, and to a lesser degree in Japan, we see the relationship between lecturer and note-taker change. Indeed, this has led to ideas like the *flipped classroom*, where lectures are recorded on video and assigned as homework, allowing for more interaction among students, if numbers permit, in the classroom. For those professors who refuse to provide alternatives to lectures, a new app (application) allows students to record both audio and video in class. It is called *snoozerr*. Seventy three percent of students report that they "cannot study without technology" (Laird, 2012).

As technology permeates the classroom, it is incumbent on the teacher to provide an environment that works with the technology, putting it to good pedagogical use, instead of working against it with prohibitions. Attempts at banning cell phone (now smart phone) use in class have been largely unsuccessful unless classes are small enough for the teacher to keep a close eye on students.

Technology use by students has led to new interactions between student and teacher.

DeGennaro finds that students and teachers using instant messaging (IM) have interactions of the following types: "Negotiated goals, Co-constructed problem solving, and supportive argumentation" (DeGennaro, 2008. p. 11).

Although still in their initial stages, studies show that one-to-one use of personal technology is the most advantageous to learning. When students have their own technology (often called BYOD, or Bring Your Own Device), they are invested in maintaining the tools needed to implement learning, and integrate them into life beyond the classroom. Technology mandated or provided by the school tends to get used only minimally, and is seen by students as an obligation instead of an opportunity.

Attention in the Language Classroom

Adding language to the mix of learning and classroom, along with the distractions of technology increases motivation, but also adds a substantial cognitive load. In addition, a different kind of attention is required for language learning. Developed in the last two decades, Consciousness Raising (not the political variety of Mao Zedong), is simply a way to draw attention to elements of linguistics in utterances which students are attempting to produce.

To look more closely at attention in the language classroom we must first consider interactions and how they are affected by classroom interaction.

> "Schutz (1967) recognized that being involved in a face-to-face interaction transforms an individual's experiences, creating "attentional modifications" on each actor (p. 171). When people are involved in an interaction, they influence each other's conscious experience and the way each attends to the world. In understanding attention, it is critical to look not only at individual actors, but also the interaction transpiring between two or more actors (Scott, 2009, p. 113).

Language and linguistics have taken a long look at attention in the classroom, breaking it down into its constituent elements. "...Stuss, Shallice, Alexander, and Picton (1995) attempted to taxonomize attention by identifying five main component processes underlying the performance of attention tasks: monitoring, energizing, inhibiting, contention scheduling adjustment, and if-then logic control" (Segalowitz and Frenkiel-Fishman, 2005, p. 645). Language itself is a part of the cognitive process, and in a way is a filter that guides attention to the most salient social interactions.

> "Language itself can be viewed as an *attention-directing system*, in a sense expressed by many cognitive linguists (Langacker, 1987; Talmy, 1996, 2000; Tomasello, 1998). The central idea here is that language serves to direct the interlocutor's attention as he or she builds a mental representation of the meaning conveyed in the incoming message. As has been proposed by Langacker and Talmy, this representation or schema construction involves a number of cognitive phenomena,

including, among others, foregrounding and backgrounding of information—that is, placing pieces of information in particular relationships to each other (see especially Talmy, 2000, chap. 4) (Segalowitz and Frenkiel-Fishman, 2005, p. 645).

Results in a study of attentional control and language learning (n＝16) showed that, "Bilinguals' speed of attention control in the L2 accounted for a significant proportion of the unique variance in their proficiency in that language." and "Hierarchical regression analysis revealed that, when taken together, L1 and L2 attention control accounted for 59% of the variance in the bilingual proficiency measure" (Segalowitz and Frenkiel-Fishman, 2005, p. 651).

It is hard to extricate attention from language. This may be something desirable for research purposes, but one has to understand that it may not be the best for learning. The research is at such an early state, perhaps it is now best to work with a more natural approach to language teaching and learning. Richard Schmidt was one of our best researchers, and yet we find:

"If all these accounts are correct, attention is a crucial concept for SLA. The allocation of attention is the pivotal point at which learner-internal factors (including aptitude, motivation, current L 2 knowledge, and processing ability) and learning-external factors (including the complexity and distributional characteristics of input, discoursal and interactional context, instructional treatment, and task characteristics) come together. What then happens within attentional space largely determines the course of language development, including the growth of knowledge (the establishment of new representations), fluency (access to that knowledge), and variation.

However, it could be argued that attention in these accounts is merely a *deus ex machina* that does not explain anything…To gain a better understanding of what attention is and how it works, it is necessary to turn to psychology…(Schmidt, 2001, p. 11).

Improving Attention

Attention affects language learning in the classroom at every level. From simple attention to the task at hand, where teachers strive to expand the time on task during any classroom activity, to the very basic constructs of language itself, attention is a key factor. There are many ways to improve attention at any of these levels.

At a personal level for both teacher and learner, meditation is the most time-tested way to improve attention. When meditation permeates into mindful activities, there is a benefit across all the levels of attention. Mindfulness itself is probably the most pure kind of attention.

There are many activities designed to improve mindfulness or attention that can be applied in class. Instead of taking attendance, a short practice session at the beginning of class, focusing on one of the many levels of attention (attention to a language point,

attention to a skill, attention to a habit) is often helpful. Most important is the realization that students (and teachers) have control over what they attend to, and what they ignore. This difference between voluntary attention and involuntary distraction is the key to focus.

Technology, while often contributing to the distraction, does have tools to harness attention. Software is available that blanks out all distractions for a set period of time so that people can work exclusively for an optimal 20 minutes, take a short break, and then get back to a focused task. Monitoring software shows you which programs you use each day, tallying up a weekly score of productive and distracting software use. This author has been able to raise the productive end of his software use from 45% to more than 70% by closely monitoring and diminishing his use of sites like YouTube and Facebook.

Language learning is a messy business, one in which students need interaction with proficient speakers to improve at a great rate. Finding such speakers and contacting them when and where needed is the key to effective use of technology as a communication channel. This sort of social language learning is an effective addition to classroom practice. In the classroom, new programs that both control the flow of information, eliminating distractions, yet allowing enough flexibility to branch off if the student wishes to do so, are now available. It is again incumbent upon teachers to provide an environment where there is room to roam, but to foster the discipline to stick to the task the student chooses.

Cited Works

Carr, N. (2008, July). Is google making us stupid?: What the internet is doing to our brains [Web log message]. Retrieved from http://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/306868/

DeGennaro, D. (UMass/Boston). (2008). Learning Designs: An Analysis of Youth-Initiated Technology Use. *Journal of Research on Technology in Education*, 41(1), 1–20.

Fox, Z. (2011, November, 10). 80% of Smartphone Users Multitask While Watching TV [STATS]. Retrieved February 12, 2013, from *Mashable*: http://mashable.com/2011/11/10/smartphone-multi-tasking/

Karges, C. (1999). *Ignite Your Intuition*. Health Communications. Retrieved from http://books.google.co.jp/books?id=_eyIaQyj6jwC

Laird, S. (2012, May 06). How Tech Is Changing College Life [INFOGRAPHIC]. *Mashable*. Retrieved from http://mashable.com/2012/05/06/tech-college-infographic/

McDonough, K. (2013). Study: Tiny distractions cause double the mistakes. Salon Magazine. http://www.salon.com/2013/01/11/study_tiny_distractions_cause_double_the_mistakes/ Retrieved February 12, 2013.

Rheingold, H., & Weeks, A. (2012). *Net Smart: How to Thrive Online*. Cambridge, MA: MIT Press

Runes, Dagobert D. (ed.) (1962). *Dictionary of Philosophy*. Totowa, NJ: Littlefield, Adams, and Company

Schmidt, R. (2001). Attention. In P. Robinson, *Cognition and Second Language Instruction*. Cambridge University Press. pp. 1–32. ISBN 978-0-521-80288-8. Retrieved 11 February 2013.

Scott, J. (2009). Multitasking and attention in interaction: Dealing with multiple tasks in everyday family life. UCLA. Dissertation. UMI 3384038

Segalowitz, N. & Frenkiel-Fishman, S. (Concordia U.). (2005). Attention control and ability level in a

complex cognitive skill: Attention shifting and second-language proficiency. *Memory & Cognition*, 33(4), 644–653.

Stober, D. (2012, January 25). Multitasking may harm the social and emotional development of tweenage girls, but face-to-face talks could save the day, say Stanford researchers. Retrieved from http://news.stanford.edu/news/2012/january/tweenage-girls-multitasking-012512.html

Stone, L. (2002). Continuous Partial Attention: What is continuous partial attention? Retrieved from http://lindastone.net/qa/continuous-partial-attention/

Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other*. (1ed.). New York: Basic Books

（ケビン・ライアン　　英語コミュニケーション学科）